

FIELD IMPACT INSULATION TESTS

HASTINGS FLOORWORLD, 10 LAWRENCE DRIVE, NERANG



TEST REPORT

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TITLE Field Impact Insulation Tests
Hastings Floorworld, 10 Lawrence Drive, Nerang,
QLD 4211
Test Report

TESTS BY Braedon Hall
Acoustic Engineer - Palmer Acoustics (Australia) Pty Ltd

REPORT DATE 4 November 2020

TEST DATE 4 November 2020

TEST LOCATION Level 2 Kitchen
to Level 1 Toilet/Bathroom

FOR Airstep Flooring

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1.0 INTRODUCTION

Palmer Acoustics has been engaged by Airstep Flooring to perform field impact insulation tests at Hastings Floorworld, 10 Lawrence Drive, Nerang. The tests were conducted on the 5mm Imagine Soleil Harvest Beige Hybrid flooring installed in the kitchen on level 2. The measurements were conducted in the toilet/bathroom on level 1 – directly beneath the kitchen.

Floor systems tested:

- 5mm Imagine Soleil Harvest Beige Hybrid flooring

2.0 EQUIPMENT AND PROCEDURES

2.1 Measurement Procedures

Testing was conducted in conformance with ISO 16283-2:2015 “Field measurement of impact sound insulation of floors”. The evaluation of the results, to derive the single figure $L'_{nT,w}$ rating, was conducted to ISO 717-2 2013 “Rating of insulation in buildings and of building elements – Part 2 Impact Sound Insulation”.

Each floor was tapped in multiple different positions with the receiving space’s sound measurements averaged over 2 x 30 seconds periods - per test position.

Ambient sound levels were measured before the testing with the results included in the assessment as per standard.

Receiving room reverberation measurements were performed, utilising the Norsonics Sound Analyser Nor140, at multiple locations throughout the space, with the results arithmetically averaged.

2.2 Instrumentation

The following instruments were used in the evaluation.

- Norsonics Nor140 Sound Analyser (serial number 1403252)
- Look Line tapping machine EM50 (serial number TM.14031)
- B & K 4230 Calibrator #3 (serial number 1638750)

The sound level measuring equipment was field calibrated before and after each measurement session and was found to be within 0.2dB of the reference signal. All instrumentation used in this assessment holds a current calibration certificate from a NATA accredited calibration laboratory.

3.0 DESCRIPTION OF ROOMS

All windows and doors were closed in the source room and receiving room.

Transmitting Room (Kitchen on Level 2)

Test Floor: 5mm Imagine Soleil Harvest Beige Hybrid flooring;
Underlay: No underlay;
Walls: Plasterboard with tile;
Room finish: Furnished.

Receiving Room (Toilet/Bathroom on Level 1)

Ceiling: Concrete Slab;
Floor: Vinyl;
Walls: Plasterboard with tile;
Room finish: Furnished.

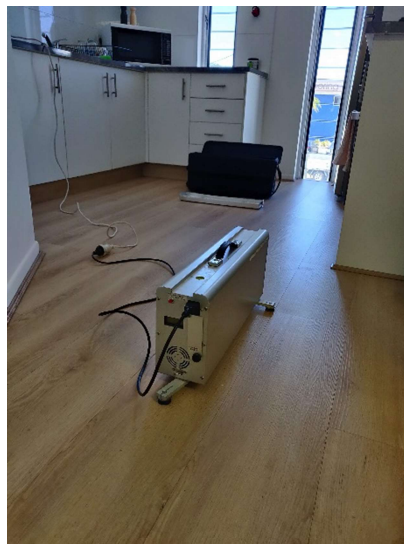


Figure 1: Testing on the 5mm Imagine Soleil Harvest Beige Hybrid flooring in the kitchen on Level 2.

4.0 RESULTS

Our tests gave the following results:

Table 1: Test Result Summary – Floor impact tests

Test System	L'nT,w
5mm Imagine Soleil Harvest Beige Hybrid flooring	52

Test Certificates detailing the $1/3$ octave band results are provided in Appendix C to this report in terms of L'nT,w in accordance with ISO 717 - 2: 2013.

The $L'nT,w$ term is used in the Building Code of Australia (BCA), see also Appendix A. It should be noted that $L'nT,w$ is a weighted room noise level and that a lower number represents better performance.

5.0 CRITERIA

Under Building Code of Australia (BCA) standards, a floor when installed in a sole-occupancy unit (SOU) above another SOU must provide insulation against the transmission of impact generated sound sufficient to prevent illness or loss of amenity to the residents. Compliance with this performance requirement is verified by compliance with the following:

Floor Impact Insulation Test

BCA Verification Methods FV5.1, impact generated sound: a weighted standardized impact sound pressure level ($L'nT,w$) not more than 62 when determined under AS ISO 717.2.

6.0 CONCLUSION

The 5mm Imagine Soleil Harvest Beige Hybrid flooring installed in the kitchen on level 2, achieved $L'nT,w \leq 52$, which complies with the BCA verification method (i.e. $L'nT,w \leq 62$). We expect similar performance will be achieved when installed in a residential situation. The achieved performance equates to a 3-star rating by AAAC¹ standards.

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Approved by:



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¹ Association of Australasian Acoustical Consultants - Guideline for Apartment and Townhouse Acoustic Rating

APPENDIX A

GLOSSARY

IMPACT MEASUREMENT AND ASSESSMENT DESCRIPTORS

- $L_{Aeq,T}$ – Time average A-weighted sound pressure level is the average energy equivalent level of the A Weighted sound over a period "T".
- L_{Aeq} – Equivalent Continuous Noise Level. The noise level in dB(A) which if present for the entire measurement period would produce the same sound energy to be received as was actually received as a result of a signal which varied with time. Normally abbreviated to "Leq" or "LAeq", often followed by a specification of the time period (such as 1 hour or 8 hours) indicating the period of time to which the measured value has been normalized;
- $L'_{nT,w}$ – Weighted Standardised impact sound pressure level; a measurement of impact sound transmission between rooms. Lower values denote better performance. The single figure measure is derived by adapting a standard response curve to measured 1/3 octave band sound pressure levels. Measured results are adjusted based upon a reverberation time of 0.5 sec in receiving room. Normally derived from a field test.
- $L'_{n,w}$ – Weighted Normalized impact sound pressure level; a laboratory measurement of impact sound transmission between rooms. Lower values denote better performance. The single figure measure is derived by adapting a standard response curve to measured 1/3 octave band sound pressure level measurements. Measured results are adjusted based on the absorption of 10m² in the receiving room. Normally derived from a laboratory test.
- C_I – A spectrum adaptation term compensating for the effect of floor coverings when applied to bare floors under test. The usually negative value, in decibels, is added to the single-number quantity, L'_{nw} or $L'_{nT,w}$.
- **Field Impact Insulation Class (FIIC)** – a single-number rating derived from measured values of normalized one-third octave band impact sound pressure levels in accordance with Eq 4 and the reference contours in Classification E 989. It provides an estimate of the sound insulating performance of a floor-ceiling assembly and associated support structures under tapping machine excitation.
- **Impact Insulation Class (IIC)** – This classification covers the determination of a single-figure rating that can be used for comparing floor-ceiling assemblies for general building design purposes.
- **Impact Sound Pressure Level (L)** – the average sound pressure level in a specified frequency band produced in the receiving room by the operation of the standard tapping machine on the floor assembly, averaged over each of the specified machine positions.
- L'_{nT} – **Standardised Impact Sound Pressure Level** – the impact sound pressure level standardised to room with a reference reverberation time of 0.5 seconds.

- *L'_n* – *Normalized Impact Sound Pressure Level* – the impact sound pressure level normalized to reference absorption area of 10 metric sabins (108 sabins).
- *Receiving Room* – a room below or adjacent to the floor specimen under test in which the impact sound pressure levels are measured.
- *Source Room* – the room containing the tapping machine.

STANDARDS

- *ISO 16283 – 2*
Acoustics – Field measurement of sound insulation in buildings and of building elements – Part 7: Default procedure for sound pressure level measurement
- *ISO 717 – 2*
Acoustics – Rating of sound insulation in building and of building elements – Part 2: Impact sound insulation
- *ASTM Classification E 1007 – 97*
Standard Test Method for Field Measurement of Tapping Machine Impact Sound Transmission Through Floor-Ceiling Assemblies and Associated Support Structures
- *ASTM Classification E 989 – 89*
Standard Classification for Determination of Impact Insulation Class (IIC)

APPENDIX B

CALCULATION METHODOLOGY - $L'_{nT,w}$

Standardized impact sound pressure level – ISO 16283-2:2015

$$L'_{nT} = L_i - 10 \log \left(\frac{T}{T_0} \right)$$

L'_{nT} is the standardized impact sound pressure level;

L_i is the impact sound pressure level;

T is the reverberation time in the receiving room;

T_0 is the reference reverberation time in the receiving room; for dwellings, $T_0 = 0.5$ s.

Method of comparison – ISO 717-2:2013

To evaluate the results of a measurement of L'_{nT} in one-third-octave bands, the reference curve is shifted in increments of 1 dB towards the L'_{nT} curve until the sum of unfavourable deviations is as large as possible but not more than 32.0 dB.

An unfavourable deviation at a particular frequency occurs when the results of measurements exceed the reference value. Only the unfavourable deviations are taken into account.

The value, in decibels, of the reference curve at 500 Hz, after shifting in accordance with this procedure is $L'_{nT,w}$.

Correction to the signal level for background noise – ISO 16283-2:2015

If $(L_{sb} - L_b) > 10$, then $L = L_{sb}$

If $10 > (L_{sb} - L_b) > 6$, then $L = 10 \log \left(10^{\frac{L_{sb}}{10}} - 10^{\frac{L_b}{10}} \right)$

If $6 > (L_{sb} - L_b)$, then $L = L_{sb} - 1.3$

L is the adjusted signal level, in decibels;

L_{sb} is the level of signal and background noise combined, in decibels;

L_b is the background noise level, in decibels.

APPENDIX C

Test certificates (1)

FIELD IMPACT SOUND INSULATION - TEST CERTIFICATE

Test 1 of 1

5mm Imagine Soleil Harvest Beige Hybrid Flooring

PROJECT: 5080 Hastings Floorworld, 10 Lawrence Drive, Nerang
Test Location: Level 2 Kitchen to Level 1 Toilet/Bathroom
Client: Airstep Flooring
Test Performed: Braedon Hall

Meas. Date: 4-Nov-2020
Meas. Parameter: LLeq
Tapping Machine: Look Line EM50
Receiving Room Volume: 11 m³

DESCRIPTION OF FLOOR AND SPECIMEN

Test Surface: 5mm Imagine Soleil Harvest Beige Hybrid Flooring
Underlay:
Adhesive:
Ceiling: Plasterboard
Slab: Concrete

No. of Source posn: 2
Mic. posn: 2 sweeps
RT meas: 4 Imp.
SLM: Nor 140

Weighted Standardized Impact SPL

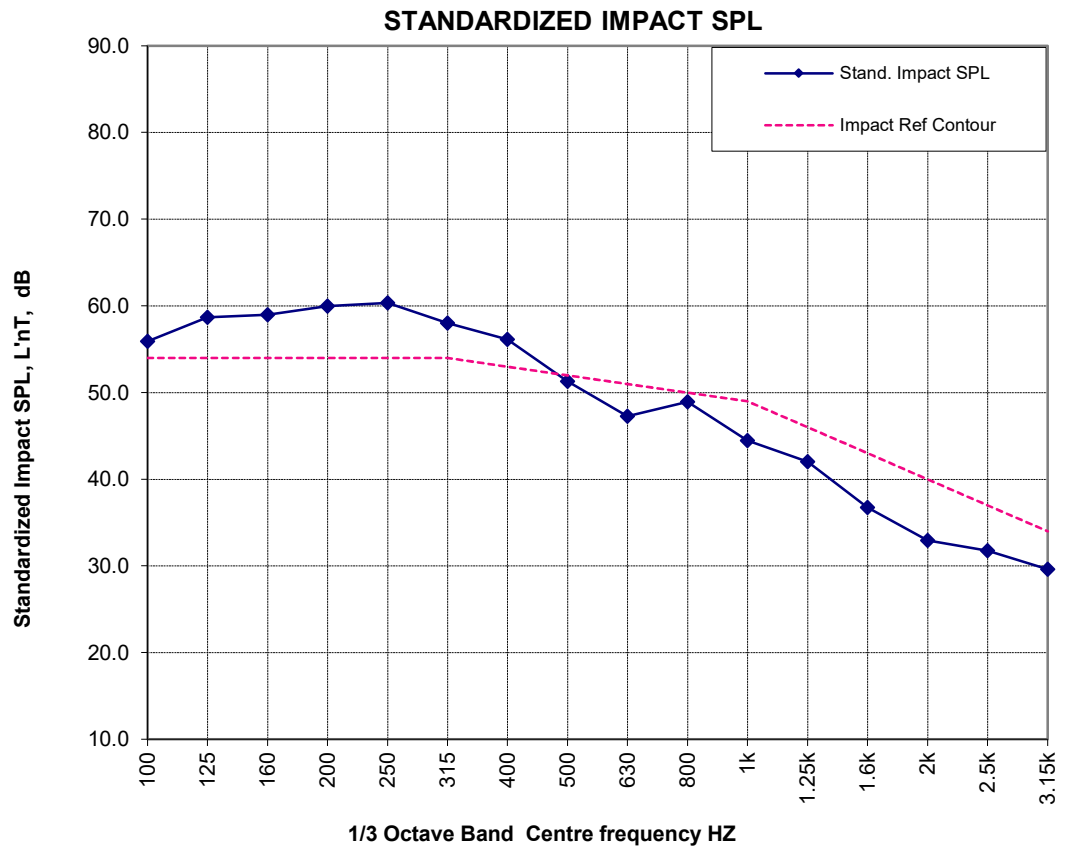
L'nT,w

52

ISO 16283-2:2015 & 717-2:2013

Results standardized to a RT of 0.5 seconds

Centre Frequency Hz	Stand. Impact SPL dB	Impact Ref Contour dB	Deficiencies dB
100	55.9	54	1.9
125	58.7	54	4.7
160	59.0	54	5.0
200	60.0	54	6.0
250	60.3	54	6.3
315	58.0	54	4.0
400	56.1	53	3.1
500	51.3	52	
630	47.2	51	
800	48.9	50	
1k	44.5	49	
1.25k	42.0	46	
1.6k	36.7	43	
2k	32.9	40	
2.5k	31.7	37	
3.15k	29.6	34	
Total			



L'nT,w 52 31.0